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Comparing nursing student learning using lecture and lecture with CD-ROMs

Brenda A. Achelpohl-Chagolla
San Jose State University

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COMPARING NURSING STUDENT LEARNING USING LECTURE AND LECTURE WITH CD-ROMs

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Brenda A. Achelpohl-Chagolla

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APPROVED FOR THE SCHOOL OF NURSING

Mary Jo Gorney Moreno, Ph.D., R.N.

Mahra Teikmanis, M.S., R.N.

Laurie Polivy, M.S., R.N.

APPROVED FOR THE UNIVERSITY

ABSTRACT

COMPARING NURSING STUDENT LEARNING USING LECTURE AND LECTURE WITH CD-ROMs

by Brenda A. Achelpohl-Chagolla

A quasi-experimental design was used to study if teaching normal labor and delivery theory with the assistance of a CD-ROM to undergraduate nursing students was more effective in increasing knowledge than using only traditional lecture and overhead transparencies. Undergraduate baccalaureate nursing students were randomly divided into two groups. Group A was taught normal labor and delivery theory with traditional lecture and overheads; group B was taught the same content with the assistance of a CD-ROM as a visual aid during the 1-hour experimental class. Visual literacy theory was used as the conceptual framework for this study. Each participant completed a 10-question pretest and posttest. The scores from both groups were compared. Findings did not show a significant difference in mean pretest and posttest scores of the two groups.

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Heartfelt thanks to my supportive husband without whom I could not have finished school, to my daughter who allowed me to study and use her computer when I really needed it, and to my mother who taught me to be independent. In memory of my loving father. I would also like to thank my large extended family for all their help and support and express much appreciation to all my readers for their time and support.

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Chapter 1

INTRODUCTION

Baccalaureate nursing education is designed to introduce a student to nationally defined content areas of health care topics including: (a) obstetrics, (b) medical-surgical, (c) pediatrics, (d) psychiatrics, (e) home care, (f) long-term care, (g) geriatrics, and (h) community health. Finding a way to increase the skilled knowledge given to student nurses in a limited amount of time is a constant challenge to nursing faculty. Abstract theoretical content, such as the normal labor and delivery process, is a challenge for both the instructor to teach and the student to learn. If the nursing student is able to view the internal process of labor and delivery, it may increase the amount of knowledge that he or she is able to gain in the same amount of time it takes to learn with the traditional lecture method.

Topics included in one 2-hour theory lecture on normal labor and delivery at one undergraduate baccalaureate nursing school were: (a) factors that affect labor, (b) anatomy of the pelvis, (c) anatomical structures of the fetal head, (d) cardinal movements of labor, (e) maternal adaptions to labor, (f) assessment of a woman in labor, (g) uterine contractions throughout labor, (h) complications of labor, and (i) nursing actions for all stages of labor. At this same nursing school, students were required to complete 48 hours of clinical experience in obstetrics which included one day of observation in a labor and delivery unit. If there were no clients delivering on this observation day, students would graduate without seeing an actual delivery. This omission of a visual experience posed an educational dilemma: What is the most

effective and efficient pedagogical method to teach obstetric nursing content with the challenges previously described? Benner, a nurse theorist, conceptualized this dilemma in these terms: "Skilled nursing requires a sound educational base that allows for a safer and quicker experience-based skill acquisition" (Marriner-Tomey, 1994, p. 167).

Problem Area

There is a need to study the benefits of teaching nursing students obstetrical content with the aid of a CD-ROM for two reasons. First, the amount and depth of information that nursing students must learn in college is increasing because of the rapid development of health care information in society. In other words, nursing students must learn more and more content and skills in the same amount of time the preceding nursing students did. Second, obstetrics is a specialty area of nursing that has its own sub-language and subtleties that are unique and difficult to acquire.

"It has been said that from the time a student enters nursing school until he or she graduates 4 years later, much of the first year's information is outdated" (Sullivan, 1997, p. 145). Nurses must have complete understanding of their clients' disease process, pharmacological response, and psychosocial as well as individual medical history. Because of the more extensive and ever changing roles that nurses now have, nurses have needed to increase their knowledge base of many more client-centered topics than in the past.

In addition to the increased learning demands of nurses and nursing students in general, the area of obstetrics provides specific learning needs for nurses. Shoulder

dystocia. prolonged premature rupture of membranes (PPROM), and intrauterine pressure catheter (IUPC) are only a few terms that are unique to obstetrics. There is a whole vocabulary to be learned as a part of obstetric nursing. In many health care situations other than obstetrics, the nurse is able to assess the patient directly either by observation or over the telephone. In obstetrics, the nurse must be able to abstractly picture what is happening to the fetus as part of the assessment process. Thus, it is hypothesized that instruction with the assistance of the visual cues offered by the CD-ROM will enhance learning.

Purpose

The purpose of this study was to evaluate whether teaching with a CD-ROM increased knowledge more than the traditional lecture method. Ten studies were found that represented a sample of the research done in the area of teaching and technology. A scant amount of research was found regarding teaching with a CD-ROM.

Null Hypothesis

There is no significant difference between pretest and posttest scores between the students who were presented the content by the lecture method and those who were taught using the combination lecture and CD-ROM.

Definition of Term

The definition of a normal labor and delivery for the purpose of this study is a low-risk labor and vaginal delivery without complications. "Labor is considered 'normal' when the woman is at or near term, no complications exist, a single fetus presents by vertex, and labor is completed within 24 hours" (Lowdermilk, Perry, &

Bobak, 1997, p. 293). Topics such as understanding the phases and stages of labor and assessing for and knowing nursing interventions associated with rupture of membranes were considered to be nursing knowledge prerequisite to the care of the patient in the labor and delivery process.

Summary

Teaching with technology is an ever changing field with many possibilities for growth. Teaching nursing to undergraduate students in a limited amount of time is a constant challenge. Teaching nursing students abstract content with the assistance of a CD-ROM in the same amount of time compared to teaching with lecture only is an area that needed to be investigated.

Chapter 2

CONCEPTUAL FRAMEWORK AND REVIEW OF RELATED LITERATURE

This chapter described the conceptual framework for this study and a review of the related literature. Teaching a subject with multimedia graphics adds a visual aspect that traditional lecture and overhead transparencies lack. "Representational pictures provide a concrete reference for verbal information, which makes the information easier and more meaningful to the learner" (Kemp, Morrison, & Ross, 1998, p. 130). The conceptual perspective that guides this paper is visual literary theory. The literature review includes content related to technology and teaching as well as normal labor and delivery theory.

Conceptual Framework

There are five kinds of literacy; one of them is visual literacy. Literature was reviewed to answer questions related to visual literacy such as: (a) What is literacy? (b) What is visual literacy? and (c) Does visual literacy relate to students and teaching? Literacy is a noun that means "the ability to read and write" (Webster's New World Dictionary, 1990). Since Webster's definition is so narrow, a more comprehensive definition was sought. Sinatra (1986) defined five stages of literacy: (a) visual as primary, (b) oral, (c) written, (d) visual as representational, and (e) computer and technology. The five literacies proceeded from the most basic to the more complex. Visual literacy, as primary, was the first stage described by Sinatra; every culture has visual literacy. "Because visual literacy is basic to human thought, the more primitive the peoples of a culture, the more likely that visual literacy and its

representational forms will be the dominant literacy" (p. 3). Visual literacy is usually the first literacy that an infant learns, such as seeing a bottle means it is time to eat. The second stage of literacy described by Sinatra was oral literacy or language; it "is both cued by the concrete, visual world and is a cue of what information that world holds" (p. 14). A mother who holds up a bottle (concrete) to an infant and, at the same time, says the word "bottle" (information) is teaching oral literacy. The third stage of literacy described by Sinatra was written language acquisition and consisted of reading and writing. When a child goes to school in the United States, he or she usually acquires written literacy. For example, when a child learns to read or write the word "bottle," he or she is acquiring written literacy. Appendix A is a visual representation of the interactive relationship of the first three literacies.

"Stage four of literacy development is based on humankind's desire to represent meaning in nonverbal, creative, and symbolic ways" (Sinatra, 1986, p. 28). Visual literacy as representational communication, the fourth stage of visual literacy, includes imaging (composing) and producing (creating). Stage four of literacy, also known as the second stage of visual literacy, which has "direct linkage to the basic stage, is composed of the receptive processes of imagining or composing, the expressive processes of producing or creating, and the interactive effects of aesthetic engagement and appreciation" (p. 28). Appendix B is a visual representation of the interactive relationship of the first four literacies.

The fifth literacy, computer and technology literacy, is a relatively new literacy. Computer literacy includes programming and word processing as well as

reading, print, design, and computer symbols which results in interactive processing. Appendix B visually shows the relationship between the more complex literacies; visual literacy as representational communication, written literacy, and computer literacy. "Visual literacy is the active reconstruction of past visual experience with incoming visual messages to obtain meaning" (Sinatra, 1986, p. 5).

"When educators capture the power of such visual meaning and visual structure to help students articulate verbal expression, they create learning situations in which students are using their full learning potentials" (Sinatra, 1986, p. 54). Sinatra described one model that suggested the most effective way to teach was applying Dale's Cone of Experience Model (see Appendix C). "The key to use of the model whether teaching the vocabulary of the theater, the human skeleton, the parts of the plant, or of geometric shapes is to implement the model from the bottom up, from the concrete to the abstract" (p. 153). This model suggests that teaching visually is more effective than teaching verbally.

Since this study focused on teaching undergraduate nursing students normal labor and delivery with the assistance of a CD-ROM, the type of literacy it focused on was visual literacy as representational. In addition to using words or verbal symbols to describe concepts during the lecture, the investigator used visual demonstrations of the birth process on a CD-ROM for the experimental group which was an example of "activities of action" using motion pictures, which is level 7 of Dale's Cone of Experience (Sinatra, 1986, p. 153).

Using Dale's Cone, optimal learning would occur when nursing students had

studied concepts (levels 6-10), then received guided hands-on experience (levels 1-3) of normal labor and delivery with clients in labor. Classroom instruction was planned so that the theoretical concepts would precede the practicum, thus students would be exposed to visual depictions, along with the theoretical concepts of normal labor and delivery. The amount of experience that the students had with normal labor and delivery was controlled by implementing the data collection early in the semester and not utilizing participants that had recent experience working with women in labor.

Related Literature

The literature review began with a general search for teaching strategies in using technology. The review was further narrowed to literature reporting the use of CD-ROMs. There was scant literature available reporting the use of teaching with CD-ROMs. The search for articles was done in CD-ROM databases, ERIC and CINAHL, as well as on line with PUBMED. The literature search was confined to the last eight years (1989-1997). The topic of normal labor and delivery theory was also reviewed. Current textbooks were reviewed to determine relevant, timely content utilized in teaching normal labor and delivery.

Teaching and Technology

Five studies were found that represented a sample of the research done in the area of teaching and technology. Schmidt, Arndt, Gaston, and Miller (1991) studied achievement outcomes of four 15-week research courses taught at two different universities, with one control group and experimental group at each university. The experimental groups were taught nursing research using a self-paced method

exclusively with the computer; the instructor functioned as a facilitator and support person. In this study, the authors found that computer-managed instruction produced no significant statistical difference in knowledge or satisfaction from traditional classroom lecture for teaching nursing research.

Halloran (1995) discovered similar findings as Schmidt et al. (1991) in her research entitled "A Comparison of Two methods of Teaching: Computer Managed Instruction and Keypad Questions Versus Traditional Classroom Lecture." Halloran designed her own computer materials to teach a medical/surgical theory nursing class. During the class, the researcher used a computer software program to present the material and to evaluate students' learning. Data were collected from three exams. There was no statistically significant difference found between the two groups. The treatment group did show an upward trend in scores where the control group showed a downward trend in exam scores. The lower early exam scores of the treatment group was explained by a phenomenon called vampire video. Vampire video is "the concept that the method of presentation may be so exciting or unusual that it overshadowed the content or message" (Halloran, 1995, p. 287). This concept is an important one to keep in mind when developing or reading about programs that are exceptionally different from the norm.

Courses delivered by television were another type of instructional technology used for teaching nursing. Keck (1992) compared students taking traditional classes versus students taking the same classes via telecourse. The faculty stated that a major barrier to adoption of telecourses was lack of evidence that students learned

adequately. This study suggested that students taking telecourses for practical purposes were as successful in learning the content as their peers in traditional classroom settings.

Billings (1994) studied the effects of using Interactive Videodisc Instruction (IVDI) on baccalaureate nursing students. Billings found that the comfort level of students with the IVDI was higher when students worked in groups. There was no significant difference of posttest scores of students that worked alone or in groups with the IVDI.

Thomas, Delaney, and Weiler (1992) studied attitudes regarding computer use at the University of Iowa Nursing School. In an one-credit course, third-year university students were introduced to computer technology as well as professional nursing. "The improvement in attitudes toward computing in nursing that was demonstrated in this evaluative study indicates that students participating in the professional socialization course did experience desirable changes in their attitudes" (p. 169).

Teaching and CD-ROMs

Five additional studies were found that related to teaching and CD-ROMs. Brooks and Brooks (1996) looked at how to use CD-ROMs to teach chemistry. Teacher resources identified for a one-computer classroom included (a) animation, (b) visual databases, (c) demonstration manuals, (d) laboratory manuals, and (e) encyclopedias. All of these were available on CD-ROMs to assist with teaching chemistry. Although this was not a formal study, the authors concluded that: "With

appropriate real laboratory experience to tie laboratory observation and technique to chemical symbols and the microscopic animations, students have much better tools to visualize chemistry" (p. 214).

Davis (1993) and Okuma (1994) studied the use of CD-ROM databases. Okuma (1994) conducted a study comparing MEDLINE and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and the number of relevant citations retrieved utilizing the CD-ROM software. The purpose of this study was to develop a framework to help librarians choose between the two databases when making a purchase of a database. Okuma (1994) found that CINAHL was the preferred database for nursing searches, although MEDLINE was relevant for comprehensive searches.

Davis (1993) studied the effects of four different methods of teaching how to search the literature using PsycLIT CD-ROM. One hundred and twenty students were divided into four groups, 30 for each group. Each group was taught to do the literature search via a different teaching method: (a) lecture/demonstration, (b) lecture/demonstration using a liquid crystal display, (c) video, and (d) computer-based tutorial. In this study, the video was found to be the most effective method of teaching students to do searches on the PsycLIT CD-ROM.

The use of CD-ROM data sets to teach research was described by Ailinger, Lasus, and Choi (1997) and Decker, Kincanon, and Ulrickson (1993). Ailinger et al. (1997) had graduate nursing students used secondary data analysis on CD-ROM databases to assist with gathering data for two graduate research classes. From this pilot program, the authors identified 10 steps to assist with using National Data Sets

to teach graduate nursing research. Decker et al. (1993) described the use of one CD-ROM data set in an undergraduate research program in the Department of Physics at Gonzaga University in Spokane, Washington: "CD-ROM data sets give undergraduate students a chance to work with real data on projects of potentially publishable quality" (p. 380).

Obstetric Theory

Three books were reviewed for obstetric theory content on normal labor and delivery: Novak and Broom (1995); Lowdermilk et al. (1997); and Mattson and Smith (1993). Novak and Broom (1995) had two chapters on labor and delivery which included: (a) factors that affect labor, (b) stages of labor, (c) signs of labor, (d) admission of a labor patient, (e) evaluation of labor, (f) fetal well-being during labor, (g) nursing interventions during labor, and (h) special situations. Lowdermilk et al. (1997) included three chapters on normal labor and delivery. Evaluation of fetal well-being during labor and special situations were additional topics to those included in the book listed above (Lowdermilk et al., 1997). Mattson and Smith (1993) had two chapters to cover normal labor and delivery, and the topics were the same as used by Novak and Broom (1995) except evaluation of fetal well-being during labor was covered in its own chapter. Lowdermilk et al. (1997) was the middle-range book; it covered the topics in greater depth than Novak and Broom (1995) but not to the depth of Mattson and Smith (1993).

Summary

The review of the literature revealed that there has been much interest in

teaching with technology but little research has been done on teaching with CD-ROMs. Some literature reported positive affects on visual aid technology. This study hypothesized that more students learn visually than by verbal symbols or descriptions. Nursing instructors have the unique opportunity to discover ways of helping students to learn large amounts of material with the assistance of technology. Effective classroom instruction is complex and important because clinical instruction is so unpredictable in obstetric nursing. Following a review of ten related studies, many questions remained, thus additional research was recommended.

Chapter 3

THE METHOD

This study explored the question: Does teaching normal labor and delivery with the aid of a CD-ROM increase knowledge more than teaching with only traditional lecture? This chapter described the study design, sampling methods, setting, instruments, teaching intervention, and plan for data analysis.

Procedures

Study Design

The design for this study was quasi-experimental and was done using a pretest and posttest with randomly assigned groups of students. Approval from W. B. Saunders Company (see Appendix D) was obtained in order to use test questions from Core Curriculum for Maternal-Newborn Nursing (Mattson & Smith, 1993) for the pretest/posttest. Permission to conduct the study and recruit nursing students was obtained from the San Jose State University, School of Nursing (see Appendix E), as well as Institutional Review Board, Human Subjects (see Appendix F) prior to the gathering of any data or recruitment of subjects. The research produced descriptive data about students' knowledge of normal labor and delivery.

Sampling Methods

Prior to meeting the class, the consent forms were coded and randomly divided into two groups, a control group and an experimental group, using a random number table. One week before the study was initiated, the researcher explained the study to the 40 students enrolled in an undergraduate baccalaureate junior/senior obstetric

theory nursing class. The students were offered the opportunity to participate during the last 10 minutes of their regularly scheduled class. Signed consents were received from 32 students.

The final sample had 22 adult undergraduate generic and advanced placement junior and senior nursing students at San Jose State University. There were no expected risks, but a possible benefit would be enhanced learning for participation in the research to the subjects. The subjects received candy after each class was completed to acknowledge gratitude for participation.

The rights to confidentiality of the subjects were protected. Only the researcher had access to both identification numbers and the names of the students. No names or identification numbers were used in the report. The guarantee of anonymity was given verbally, and a copy of the written consent form was given to each student.

Consent from the assigned regular faculty member of the normal labor and delivery class was received. Human subjects approval was received in writing from the School of Nursing, as well as the Institutional Review Board, Human Subjects at San Jose State University. Students who did not want to participate in the research were given the opportunity to attend either class but not take the pretest and posttest. There were a number of students who decided not to participate in the study. One student verbalized that she was concerned about not doing well on the actual test for the class if she participated in the study because she could miss something important.

Teaching Methods

The control group was taught a theory class on normal labor and delivery using the traditional lecture method and overhead transparencies. The experimental group was taught the same content; however, the lecture presentation was augmented by utilizing two CD-ROMs and the same overhead transparencies. The lecture notes and transparencies were approved by the faculty of record before the class was taught. The class was taught to students early in the semester so that clinical experiences in normal labor and delivery would be at a minimum in order to eliminate clinical experience as an intervening variable.

The classes, including the outline and overhead transparencies, were designed to meet course objectives (see Appendix G) that had been used by the regular faculty instructor to teach normal labor and delivery for 1 year. Chapters 14, 17, and 18 of Maternity and Women's Health Care (Lowdermilk et al., 1997) were the required readings for this class. The assigned readings addressed the content defined by all 17 objectives; content presented in lecture highlighted material addressed in 11 objectives. Ten of the objectives were addressed by the material contained in the CD-ROMs. Although not all objectives for the class were included in the content of the CD-ROMs, the content was selected to enhance learning of the overall content by the students who viewed the CD-ROM, especially if they were visual learners.

Two CD-ROMs were used to teach normal labor and delivery; both were produced by ADAM Software, Inc. Video and animation portions of the Nine Month Miracle: User's Guide, version 1.0, which had graphics as well as audio, was used to

teach rupture of membranes, early labor, delivery, and placenta delivery. These four animated portions of the CD-ROM took 4 minutes and 45 seconds of playing time at medium speed. An audio-video clip from the Nine Month Miracle entitled vaginal delivery was used and took 1 minute of playing time. The graphics without audio of one animation from the Obstetrics & Gynecology Animation Book, version 2.3, was also used to teach vaginal delivery, and this took 2 minutes at slow speed. The total time that was allowed to show the CD-ROMs, including set-up time, was 10 minutes.

Setting

The CD-ROM was operated by the researcher who was certified in inpatient obstetrics. The entire experimental group viewed the CD-ROM during the lecture presentation of obstetric content. Both classes were taught by the researcher; each class was taught over 1 hour. To help increase participation, both classes were presented during the students' regular class time. The control group was taught in the first hour: 45 minutes of lecture and overheads, and 10 minutes for the pretest and posttest. The class for the experimental group was given in the second hour of the scheduled theory class: 35 minutes for lecture and overheads, 10 minutes for the CD-ROMs, and 10 minutes for the pretest and posttest. Both classes were presented in the regular classroom on the San Jose State University campus which had the technology including two color TV monitors needed to present the audio/video CD-ROM as well as project overhead transparencies.

Instruments

A pretest (see Appendix H) of 10 multiple choice, matching, and true/false

questions was used to collect baseline data from all subjects prior to the class lecture. The same test was used as the posttest to collect data following each presentation. The posttest was given immediately after each presentation so that the two groups were not able to compare notes or discuss the treatment. The pretest/posttest questions were obtained from Core Curriculum for Maternal-Newborn Nursing (Mattson & Smith, 1993), which was a study aid textbook for nurses. The textbook is an appropriate resource for nurses wishing to sit for certification and those entering the field of obstetrics. The 10 posttest questions related to 8 of the 17 objectives (see Appendix H). The posttest was reviewed for reliability and validity by two nurses knowledgeable in the obstetric field. A written consent was obtained from the publisher of Core Curriculum for Maternal-Newborn Nursing (Mattson & Smith, 1993) for the use of questions from chapters 14 and 15 of the book.

Data Analysis

The data that were collected were subjected to descriptive level, quantitative statistics. A statistician was utilized to assist with this segment of the research. No formal demographic data were collected. The 10-question pretest and posttest was used to determine the student's knowledge of normal labor and delivery. The greater number of correct responses on the tests, the greater the knowledge on the topic of normal labor and delivery. The same test was used for the pretest and posttest. The scores of the participants from both groups were compiled. The pretest and posttest mean scores of the two groups were compared.

Chapter 4

ANALYSIS AND INTERPRETATION OF THE DATA

The purpose of this study was to determine if teaching normal labor and delivery with the aid of a CD-ROM helped to increase knowledge more than traditional lecture with overheads. The sample consisted of 19 undergraduate junior/senior baccalaureate nursing students from an obstetric theory class. The pretest and posttest mean scores of the two groups were compared.

Description of the Sample

Of the 40 students registered for the class, 32 signed consents one week prior to participation in the study with a return rate of 80%. On the day of the class, 22 participated in the study. Three participants' data were not utilized, two because they had taken the class previously and one because she worked directly with women in labor. These three participants were excluded because the previous labor and delivery experiences of these students would create an extraneous variable and invalidate the study. The final sample consisted of 19 participants, 6 in the experimental group and 13 in the control group, with a final participation rate of 47.5%.

All subjects were junior/senior, generic and licensed vocational nurse advanced placement undergraduate baccalaureate nursing students in an obstetric theory class. The participants had minimal amount of recent clinical and theoretical experience in labor and delivery prior to this intervention.

Findings from the Obstetric Pretest and Posttest

There were 10 multiple choice, true/false, and matching items on the obstetric

pretest and posttest related to normal labor and delivery. If the student answered all questions correctly, there was a possible score of 10; it was assumed that the higher the score, the more knowledge subjects had about normal labor and delivery.

Control Group

The mean score for the control group pretest in this study was 3.846. The mean score for the control group posttest in this study was 6.769. The highest score achieved for the pretest was 9 ($\underline{n}$ = 1), and the lowest score obtained on the pretest was 0 ($\underline{n}$ = 1). The highest score achieved for the posttest was 10 ($\underline{n}$ = 1), and the lowest score obtained on the posttest was 3 ($\underline{n}$ = 1). Table 1 shows the frequency of scores for the pretest and posttest of the control group. The difference in the mean of the pretest and the posttest scores of the control group was 2.923 with a standard deviation of 1.553. Table 3 shows the mean pretest and posttest scores as well as the difference of the mean scores for the control group.

Experimental Group

The mean score for the experimental group pretest in this study was 4.167. The mean score for the experimental group posttest in this study was 6.333. The highest score achieved for the pretest was 7 ($\underline{n}$ = 1), and the lowest score obtained on the pretest was 1 ($\underline{n}$ = 1). The highest score achieved for the posttest was 8 ($\underline{n}$ = 1), and the lowest score obtained on the posttest was 3 ($\underline{n}$ = 1). Table 2 shows the frequency of correct questions for the pretest and posttest of the experimental group. The difference in the mean of the pretest and the posttest scores of the experimental group was 2.167 with a standard deviation of 1.835. Table 3 shows the mean pretest

Table 1

Frequency and Percentage of Control Group Pretest and Posttest Scores

Total # Questions Correct	n Pretest	%	n Posttest	%
0	1	7.7	0	0
1	1	7.7	0	0
2	1	7.7	0	0
3	2	15.4	1	7.7
4	4	30.8	0	0
5	2	15.4	3	23.1
6	1	7.7	2	15.4
7	0	0	1	7.7
8	0	0	4	30.8
9	1	7.7	1	7.7
10	0	0	1	7.7

Note. Percentages were rounded. Total may be greater than 100%.

Table 2

Frequency and Percentage of Experimental Group Pretest and Posttest Scores

Total # Questions Correct	n Pretest	%	n Posttest	%
0	0	0	0	0
1	1	16.7	0	0
2	0	0	0	0
3	2	33.3	1	16.7
4	1	16.7	0	0
5	0	0	0	0
6	0	0	1	16.7
7	2	33.3	3	50.0
8	0	0	1	16.7
9	0	0	0	0
10	0	0	0	0

Note. Percentages were rounded. Total may be greater than 100%.

Table 3

Mean Pretest and Posttest Scores and Differences for Control and Experimental Groups

Group	Pretest M	Posttest M	Difference in M	SD
Control	3.846	6.769	2.923	1.553
Experimental	4.167	6.333	2.167	1.835

and posttest scores as well as the difference of the mean scores for the experimental group.

Comparisons of the Two Groups

The difference of the two mean scores between experimental and control groups was 0.756 with 18 degrees of freedom; the 2-tailed test showed $t = 0.363$. According to the analysis of the differences of the means, the pretest and posttest scores showed no significant difference of the two groups at a 0.05 level of significance ($p > 0.05$). The null hypothesis which indicated that there is no significant difference between pretest and posttest scores between the students taught with a CD-ROM compared with only traditional lecture and overheads was substantiated. Therefore, the participants in this study demonstrated a similar increase in knowledge whether they had received instruction with a CD-ROM or exclusively with lecture and overheads.

Summary

The data analysis of this study used descriptive statistics and a two tailed t-test to study the mean pretest and posttest scores and the difference in scores of the control and experimental group. The data collection instrument was a 10-question, multiple choice, true/false, and matching test. The sample consisted of 19 undergraduate baccalaureate nursing students from an obstetric theory class. The data demonstrated that, for this study, teaching normal labor and delivery with the aid of a CD-ROM did not increase knowledge more than teaching with traditional lecture.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

This study used a pretest/posttest design to determine whether teaching nursing students normal labor and delivery with the assistance of a CD-ROM increased knowledge more than teaching with traditional lecture and overheads. The sample consisted of 19 junior/senior undergraduate baccalaureate nursing students in an obstetric theory class. The data collection instrument was a 10-question multiple choice, true/false, and matching test. The control and experimental groups' mean pretest and posttest scores were compared. This chapter discusses the results and makes recommendations for future studies.

Conclusions

The data demonstrated that there was no significant difference between students' knowledge who were taught normal labor and delivery with traditional lecture and overheads compared to those who were taught with the supplemental CD-ROM as a visual aid.

Limitations

The difference in the number of participants in each group is of significance since the outcome of the study may have been affected by the difference. The limited amount of data and small sample size makes generalizing the results inappropriate. There was a 47.5% participation rate of the 40 students enrolled in the class.

Because of the complexity of the subject matter, it would have been ideal to spend the entire 2-hour lecture class on the topic, which is the usual amount of time

allotted for this class. Doing a 2-hour class for each group was not done because the participation rate would most likely have been even less if either class was given outside the regularly scheduled class time.

Students seemed eager to view the CD-ROM. There were 3 to 5 students that stayed for both 1-hour classes. The expressions on the students' faces indicated that the CD-ROM engaged their attention.

Recommendations

One possible contributing factor to there not being any significant difference between the means of the two groups was vampire video, which was mentioned earlier during the literature review. This was "the concept that the method of presentation may be so exciting or unusual that it overshadowed the content of the message" (Halloran, 1995, p. 287). Students may have placed all their attention on the multimedia aspects of the CD-ROMs so that the content was not assimilated or learned.

The data in this study indicated that using a CD-ROM as a visual aid to teach normal labor and delivery theory to undergraduate baccalaureate nursing students was not more effective in increasing knowledge than teaching with traditional lecture and overheads. Teaching a large amount of theory content in a limited amount of time is a challenging and common dilemma to nursing instructors.

Based on this study, the following recommendations were made:

1. Repeat the study with a larger sample and an equivalent number of participants for the experimental and control groups.

2. Additional studies should be done of other nursing classes to evaluate the effectiveness of CD-ROMS as visual aids.

3. Evaluate the efficacy of utilizing CD-ROM technology in teaching an obstetric theory class over an entire semester.

4. Encourage students to identify the learning strategy that is most effective for them. If the student is aware of their preferred learning strategy, they can search out learning situations that provide this strategy.

5. Utilize an instrument to measure student learning preferences and attitudes about multimedia use in the classroom. Student learning preferences may affect knowledge acquisition. Documentation of a correlation between positive student attitude regarding the teaching strategy and higher scores on the mean posttest scores would have yielded valuable data.

6. When conducting future research on teaching with technology, vampire video should be examined as a possible extraneous variable early in the research process. During the collection of the demographic data, determine if the students have been taught with CD-ROMs in the past. If the answer is yes, more information should be obtained such as frequency and use of CD-ROM video clips in lecture classes.

7. More demographic data should be collected from the students about: (a) primary language, (b) previous experiences with normal labor and delivery (personal and in school), and (c) whether the assigned reading was done prior to attending class.

Summary

This study provided valuable insight into whether teaching normal labor and delivery with the assistance of a CD-ROM was effective in increasing knowledge with this sample. The data did not demonstrate that the undergraduate baccalaureate nursing students taught with the assistance of a CD-ROM had a greater increase in knowledge than the students taught with traditional lecture and overheads. Visual literacy is an important conceptual framework for nursing faculty when teaching abstract content such as normal labor and delivery. Teaching with CD-ROMs was an interesting topic that should be explored and studied in greater depth.

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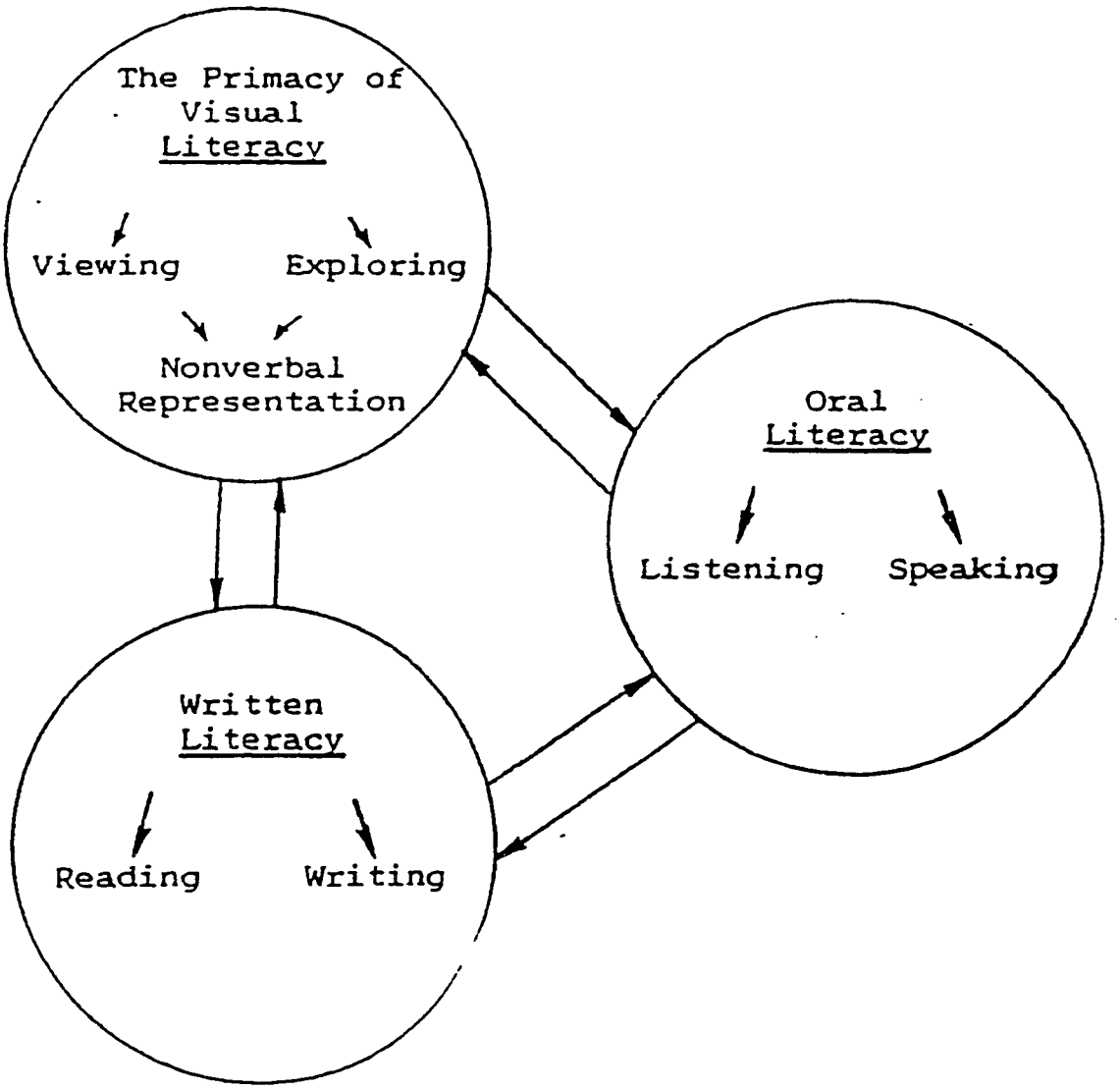
APPENDIX A

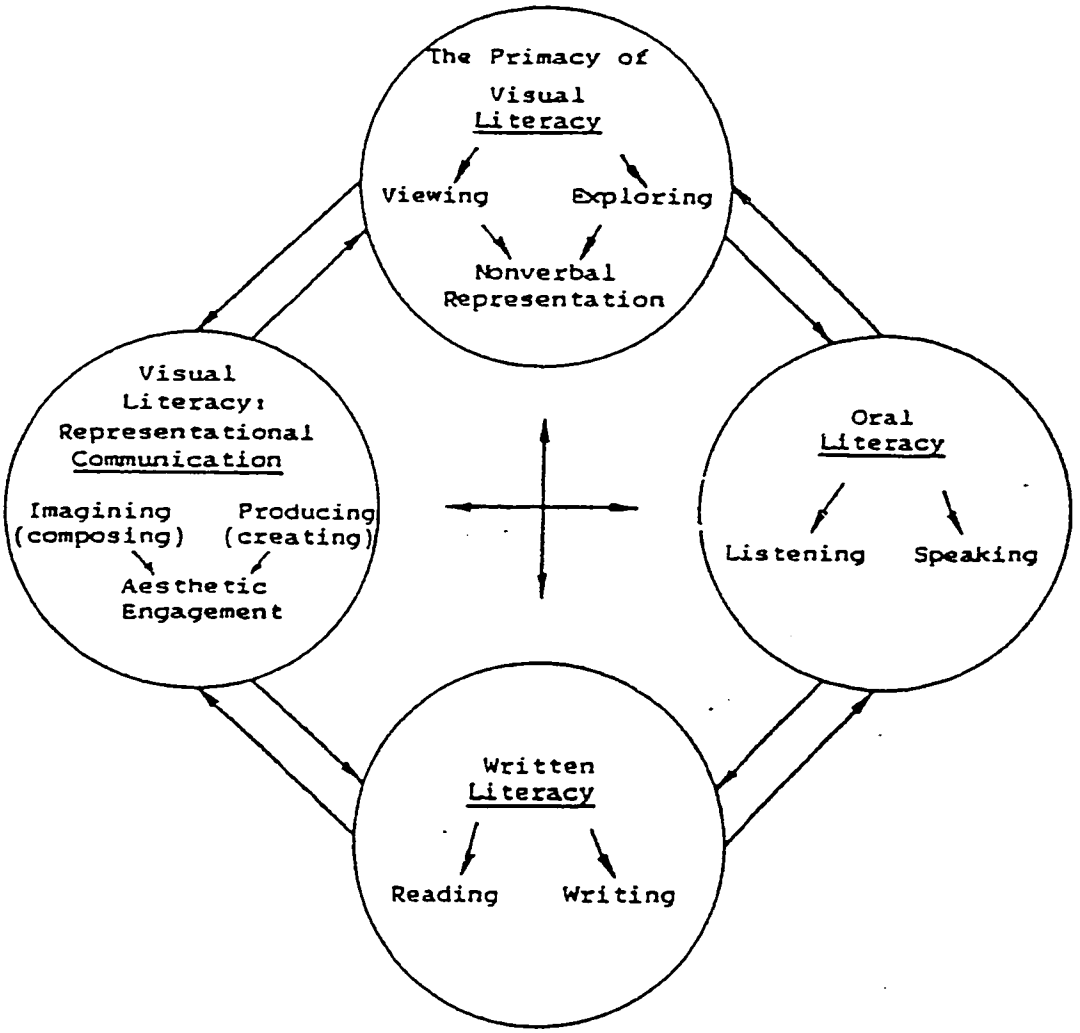
Interactive Relationship of the First Three Literacies



Note. From Visual literacy connections to thinking, reading, and writing by R. Sinatra, 1986, p. 19.

APPENDIX B

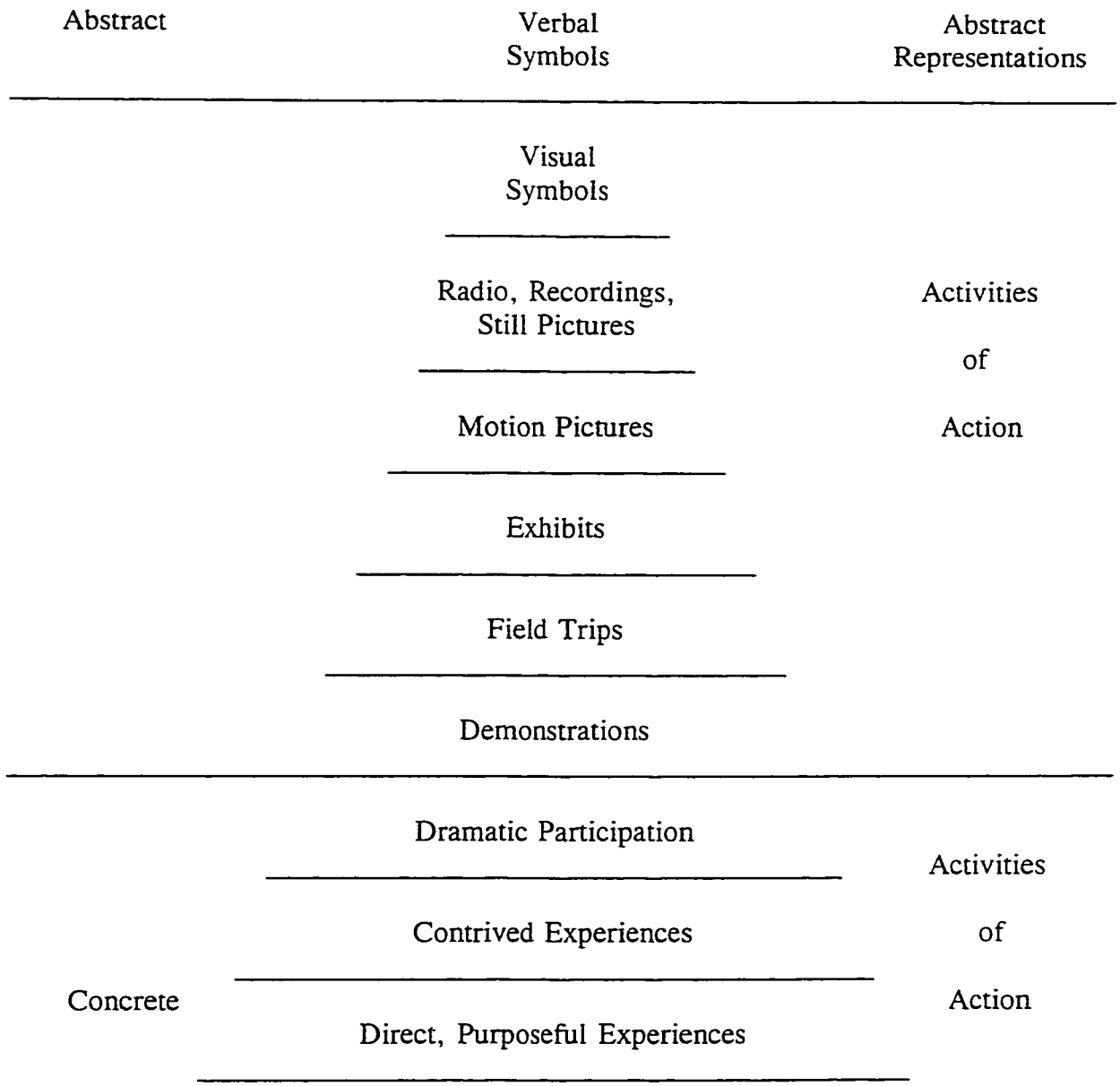
Interactive Relationship of the First Four Literacies



Note. From Visual literacy connections to thinking, reading, and writing by R. Sinatra, 1986, p. 29.

APPENDIX C

Dale's Cone of Experience Model



Note. From Visual literacy connections to thinking, reading, and writing by R. Sinatra, 1986, p. 153.

APPENDIX D

Copyright Owner's Approval

814 Sunnyarbor CT.
Campbell, CA 95008

January 20, 1998

W B. Saunders Company
Independence Square West
Philadelphia, PA 19106

I am a graduate nursing student at San Jose State University in California. I am currently doing my research proposal for the thesis portion of the masters degree. My research question is: Does the utilization of a multimedia CD ROM assist undergraduate nursing students to have increased knowledge of normal labor and delivery?

I am requesting to use approximately ten questions from your book, Core Curriculum for Maternal-Newborn Nursing edited by Susan Mattson and Judy E. Smith. They will be used as the pre and post tests to evaluate the effectiveness of teaching undergraduate nursing students with the assistance of a CD ROM. Specifically the questions that I would like to use are questions 15, 16, 18, and 19 from chapter 14, essential forces and factors in labor and questions 1, 3, 5, 8, 13, and 16 in chapter 15, normal childbirth.

I look forward to receiving written permission from you soon so that I may move forward in my research. Thank you in advance for your serious consideration of my request.

Sincerely,

B. Achelpohl-Chagolla RN

Brenda A. Achelpohl-Chagolla RN

APPENDIX E

San Jose State University School of Nursing Approval

San José State
UNIVERSITY

School of Nursing
One Washington Square
San José, CA 95192-0057
Voice 408 924-3131
Fax 408 924-3175
http://www.sjsu.edu/depts/nursing

Director
Dr. Bobbye Gorenberg

April 4, 1998

Brenda Achelpohl-Chagolla
814 Sunnyarbor Ct.
Campbell, CA 95008

Dear Brenda,

Your proposal has been reviewed by the Program Evaluation and Research Committee. Contingent on your approval from the IRB, we give you permission to contact the instructor(s) to request access to the students. The instructor's and students' participation must be entirely voluntary. The instructor of record has the descretion to use class time or out of class time to accommodate your project. Please contact Dr. Joan Edelstein, Chairperson for Semester 6 to request access to faculty and students in that semester. Please also submit a copy of the IRB approval to me as soon as possible.

I look forward to receiving a final report of your completed graduate project. If you have any questions, please do not hesitate to call me at (408) 924-3164.

Sincerely,

Bobbye Gorenberg

Bobbye Gorenberg, DNSc, RN
Director

cc: Dr. Joan Edelstein, Chairperson, Semester 6
cc: Dr. Phyllis Connolly, Chairperson, Program Evaluation and Research Committee

APPENDIX F

Human Subjects-Institutional Review Board Approval

San José State
UNIVERSITY

Office of the Academic
Vice President
Associate Vice President
Graduate Studies and Research
One Washington Square
San José, CA 95192-0025
Voice 408 924-2480
Fax 408 924-2477
E-mail gstudies@wahoo.sjsu.edu
http://www.sjsu.edu

TO: Brenda Achelpohl-Chagolla
814 Sunnyarbor Ct.
Campbell, CA 95008

FROM: Serena W. Stanford
AVP, Graduate Studies & Research

DATE: April 28, 1998

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"Teaching Undergraduate Nursing Students Normal Labor and Delivery with the Aid of a CD ROM"

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Serena Stanford, Ph.D., immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that all subjects need to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate, or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.

If you have any questions, please contact me at (408) 924-2480.

APPENDIX G

Objectives Related to Test Questions

Objectives Covered in Normal Labor and Delivery Class

*1. Define key terms in text for all assigned readings.

*2. Explain the five factors that affect labor progress.

*3 Discuss the anatomy of the pelvis in relation to dimensions that affect the progress of labor.

4. Locate key anatomical structures on the fetal head and state normal dimensions.

5. Discuss the significance of molding and overriding of the fetal sutures.

6. Describe the cardinal movements in the mechanism of labor.

*7. Describe maternal physiologic adaptations to labor.

8. Describe fetal adaptions to labor.

9. Identify factors included in the initial assessment of a woman in labor.

*10. Describe the on-going assessment of the woman in labor throughout all stages of labor.

*11. State the physical and psychosocial findings or changes indicative of progress in all stages of labor.

*12. List and describe the changes in uterine contractions throughout all stages of labor.

13. Identify signs of complications that can occur in all phases of labor.

14. State the common nursing diagnoses for all stages of labor.

*15. Identify and provide the rationale for nursing actions and interactions for all stages of labor.

16. Describe the nurse's role in managing care of the laboring woman and in providing support to the significant others.

17. Identify topics for nursing research related to labor and birth.

*Objectives related to pretest/postttest test question.

APPENDIX H

Pretest/Posttest

Pretest/Postest

1. Which of the following are characteristics of the powers of the first stage of labor?

   (1) Controlled by the involuntary nervous system.
   (2) Responsible for cervical effacement and dilatation.
   (3) Responsive to nursing interventions.
   (4) Quantified by calculating frequency times intensity.

   a. 1, 3
   b. 1, 2, 4
   c. 1, 3, 4
   d. All of the above

2. Women should be encouraged to go through labor in the upright position because this is the most correct posture for childbirth.

   a. True
   b. False

3. Which of the following are characteristics of the anxiety and fear experienced during labor?

   (1) Results in an elevated blood pressure and pulse rate
   (2) Results in an improved ability to concentrate
   (3) Results in increased pain perception
   (4) May prolong labor

   a. 1, 3
   b. 1, 2, 4
   c. 1, 3, 4
   d. All of the above

4. Which of the following nursing interventions are indicated to reduce sensory overload?

(1) Keep the room's lighting subdued.
(2) Speak quietly and calmly to the client and her support person.
(3) Provide music in the room.
(4) Avoid doing a procedure during a contraction.

a. 1, 3
b. 1, 2, 4
c. 1, 3, 4
d. All of the above

Case Study

Donna Velo, a 24-year-old gravida 2, para 1 (G2,P1), is admitted to labor and delivery at 39 weeks' gestation. A vaginal examination indicates her cervix is 80% effaced and 3 cm dilated. The presenting vertex is at -1 station. The amniotic sac is not palpated, and Donna says she thinks it has ruptured.

5. To promote comfort, Donna is encouraged to assume certain positions while in labor and to avoid others. Which of the following should not be used during labor?

a. Lateral position
b. Squatting position
c. Standing position
d. Supine position

6. On assessment, Donna is found to be completely dilated and effaced and at a +1 station. Which of the following findings suggest transition to the second stage of labor?

a. Decreased urge to push
b. Decreased bloody show
c. FHR accelerations
d. Bulging of the perineum

7. Which of the following signs would indicate that delivery is imminent?

(1) The mother has the desire to defecate.
(2) An increase in frequency, duration, and intensity of uterine contractions.
(3) The mother begins to bear down spontaneously with uterine contractions.
(4) Bulging of the perineum occurs.
(5) There is an increase in the amount of blood-stained mucus flowing from the vagina.

a. 4
b. 1, 3, 4
c. 2, 4, 5
d. 2
e. All of the above

Match each term or phrase with the definition that best fits it.

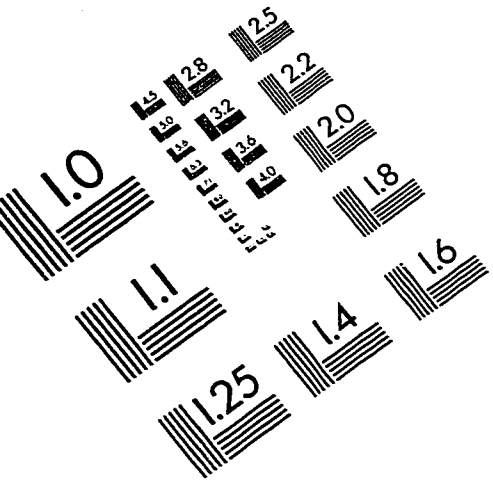
8. Enlargement of the external os to 10 cm in diameter

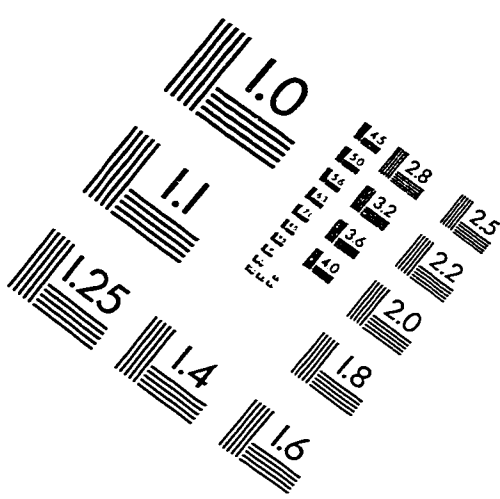
9. Maximum shortening of the cervical canal

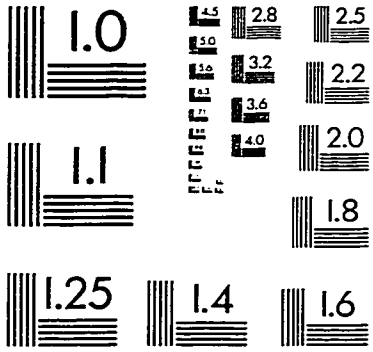
10. Settling of the baby's head into the brim of the pelvis

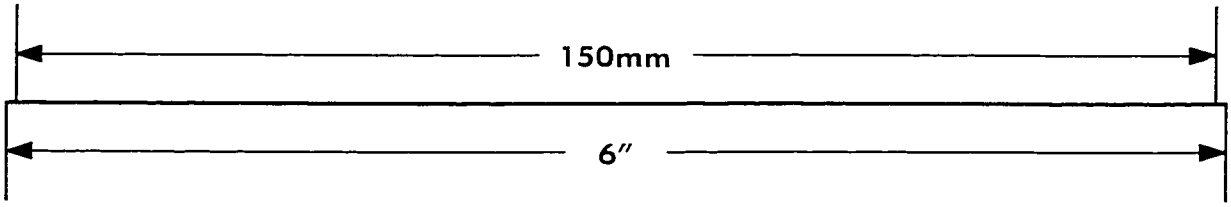
a. Uterine atony
b. Complete dilatation
c. Lightening
d. Complete effacement
e. Episiotomy

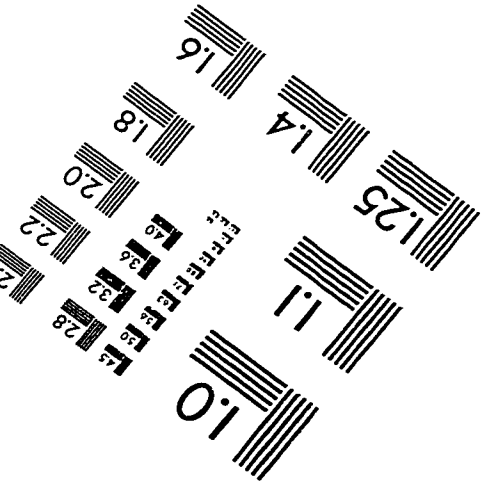
IMAGE EVALUATION TEST TARGET (QA-3)

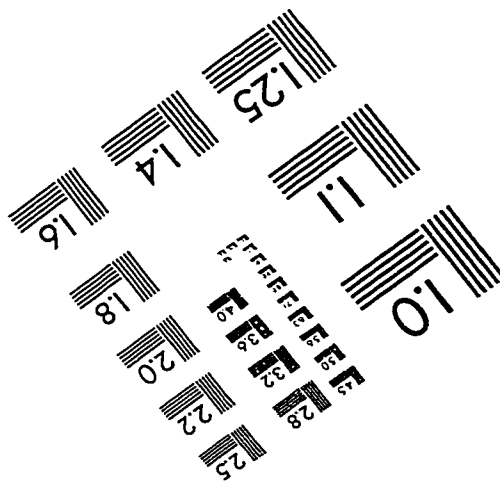












APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989